

Abstract

Satellite earth sensors (ES) generate scan lines, areas of detected infrared information gathered across the view of the earth by the satellite. The length of these scan lines is utilized by the satellite Attitude Control Subsystem (ACS) to determine the satellite pointing in roll and pitch. There are areas on the earth during particular periods of the year that can cause earth radiance gradient disturbance effects, satellite attitude errors caused by the ACS-calculated length of the scan lines becoming faulted. This invention includes methods and systems for minimizing disturbances to the satellite attitude for satellites in inclined, elliptical orbits that use infrared earth sensors to determine pitch and roll angles. These include identifying areas where earth radiance gradient events cause such disturbances and the prediction of times of such occurrences and methods for mitigating the effect of such events.